

as stated above, yet individuals among them moved in different directions and with very different speeds.

It would be found also that the variations from the mean with respect to the duration of each eddy, the path of the centre, and the intensity of the circulation about it, were matters of chance; so that the ordinary laws of chance might be applied to determine the probability that in a given place and for a given time the departure from the mean should lie within assigned limits.

Experience over the temperate and polar regions of the world has proved that on the whole certain types of weather are associated with certain surface winds, although the particular relation of each to the other may vary in different places.

In order, therefore, accurately to predict the weather, it is a matter of foremost importance to know what the direction and character of the wind will be at the time and place for which the prediction is issued.

This, however, requires not only a knowledge of the surrounding conditions at the time of issue, but also of the rate at which the conditions are changing, and, since the rate follows no known law, predictions cannot be held to be trustworthy for more than the short time during which the rate may be considered to be constant or to change uniformly.

How long this "short time" may be when reckoned in hours or days varies with the type of eddy or pressure disturbance. When the depressions are large and deep they may retain their life for several days or even more, and in such cases their rate of change may remain regular for a considerable fraction of that time.

It is in these comparatively rare conditions that the best forecasts can be made. Ordinary weather, however, is the accompaniment of shallow depressions of small intensity and short duration, the regularity of the path and rate of change of which cannot be counted on for more than a few hours. In such circumstances any forecast made for a day in advance is almost as likely to be wrong as right, and since the shallow depressions are chief occupants of the temperate and polar regions it seems that even the most complete knowledge of their present state and previous history gives very little information as to what their condition will be even a few hours later.

This leads to the conclusion given in the previous note, namely, that the information furnished by daily weather charts gives a small, but only a small, advantage in favour of forecasts made on the strength of it over the simple guess that the weather will remain as it is.

In some places, though not in England or its immediate surroundings, the diurnal variations are more important than the general pressure distribution, and in mountainous regions impending weather changes can often be foreseen from the behaviour of clouds about the hills.

Success, however, in such cases depends essentially on local experience and not on general knowledge.

A. MALLOCK.

The Plumage Bill.

My attention has been directed to an article in *NATURE* of December 11, 1913 (No. 2302, vol. xcii.), entitled "The Plumage Bill," by Sir H. H. Johnston, in which the following statements are made regarding the destruction of bird-life in Nipal:—

(1) "Originally the Nipalese respected almost religiously the fauna of their native land, like most Indian peoples. But of late they have become infected with a truly British love of life destruction. They are

incited to this by the agents of the plumage trade in Calcutta and other places, and, of course, find it a lucrative business."

(2) Nipal . . . "is permitted to import and export goods through British India under its own Customs' seals, intact and unquestioned."

"Consequently, though the laws of British India forbid on paper the export of wild birds' plumes or skins, the State of Nipal monthly exports from Calcutta to the feather markets of the world—principally London—thousands of bird skins. The Nipalese have nearly exterminated the Monal pheasant, the Tragopan, and several other gallinaceous marvels."

In replying to the above extracts from the article in question I am concerned mainly with the implication that the Nipal Government, to which I am and have for the last eight years been the accredited British Representative, are concerned with the destruction of bird-life for trade purposes, and are, in fact, the principals in the trade of bird feathers and skins.

Neither the Nipal Government nor any of its officials is privileged to export goods through British India under the Customs' seals of the State, and any traffic in bird feathers and skins such as is described in the article, if it is being carried on at all, must necessarily be done in contravention of the British Indian Customs Regulations, as no exceptions are made in favour of Nipal goods passing through our ports.

The Prime Minister in Nipal, who has seen and read the article, has authorised me to state explicitly that the Nipal Durbar have no interest whatever in the export of feathers from Nipal, and that such export is contrary to the laws of the State.

As regards extract No. (1), it is doubtless true that in old days there were fewer birds and animals destroyed in the country than at present. Originally the religion of the ruling race in the Nipal Valley and of a considerable part of what is now the modern State of Nipal was Buddhism, in which life is held sacred; whereas now the prevailing religion is Hindu "Shivaism," and the worship of Durga. Old-fashioned bows and arrows have also given way to firearms, while the sporting instinct of the Gurkha has in no way lessened with the improvement of the weapons at his disposal.

My own observation, however, in the hills surrounding the Nipal Valley does not confirm the very wide statement that the Monal pheasant, the Tragopan, and other gallinaceous marvels of this secluded country are in any danger of extinction at present.

J. MANNERS-SMITH.

The Residency, Nipal.

My statements as to the destruction of rare pheasants in the kingdom of Nipal were based, first, on facts which came to my notice when on or near the frontiers of Nipal in 1895, but a good deal more on the recent allegations made in the *Calcutta Press*, on the reports of an American ornithologist, and on other matter published in the pamphlets of Mr. James Buckland, or read by him at his public lectures. Much of this evidence was before me when the articles (to which Lieut.-Col. Manners-Smith takes exception) were written. But as it is difficult for one who writes a good deal and on many subjects (and has, moreover, in the months that have elapsed been undergoing the inconvenience of alterations to his writing-room) to keep such evidence so that it can remain always at his right hand, I have preferred to take the course of writing to all the persons who furnished these original accounts, asking them to instruct me once again, or at any rate to give me references which can be followed up. As this necessitates writing to America

and to India, as well as to persons in London, some weeks may elapse before I am able to answer the main points in Lieut.-Col. Manners-Smith's letter.

I would, however, inform Lieut.-Col. Manners-Smith that Mr. James Buckland, who had collected all or much of such evidence affecting the Government of Nipal, sought to lay this before his Highness the Prime Minister of that country, when Maharaja Sir Chandra Shamsher Jang visited this country not long ago, but Mr. Buckland was not accorded an interview and not permitted to submit, with all due respect, the case of the rare birds of Nipal, either to the Maharaja or to his English advisers.

I am sincerely glad that any article of mine should have directed the attention of the Government and British Resident of Nipal to the preservation of the Nipalese avifauna, even though that Government may have already dealt effectively with the question. This large independent Himalayan State contains within its limits some of the most wonderful birds in the world, none of which are in any degree whatever harmful to man, and most of which are of exceptional interest and beauty. The whole of the fauna of Nipal stands out as being perhaps the most remarkable of any Asiatic State. The independence of Nipal is scrupulously respected by the British Government, the country is not thrown open to access on the part of foreigners, and it might well be the national ambition of the Nipalese Government that their land should become a refuge for the wonderful birds and mammals still existing in tropical Asia, which are rapidly being exterminated elsewhere. So soon as I have the information asked for, I will forward it for publication in the columns of NATURE.

H. H. JOHNSTON.

Atomic Volume Curves of the Elements.

IN his interesting review of Prof. Letts's book on "Some Fundamental Problems of Chemistry," in NATURE of May 21, Prof. Meldola states that an atomic volume curve which includes the inert elements is there published for the first time.

Will you allow me to say that in our book on "Systematic Inorganic Chemistry," first published in 1906, Dr. Lander and I included an atomic volume curve in which the inert elements were shown; and that in our 1911 edition the curve was amended to indicate the position of helium, then recently liquefied, so that lithium was seen no longer to occupy the crest of the first wave. I may add that in Kipping and Perkin's "Inorganic Chemistry" (1911) a curve similar to ours appears.

R. M. CAVEN.

University College, Nottingham, May 25.

I AM sorry inadvertently to have done an injustice to Drs. Caven and Lander, whose claim for priority over Dr. Letts for having constructed an atomic volume curve comprising the inert elements is certainly justified. At the time of writing the review I was remote from libraries, and I had an impression that the Letts curve had been published by its author long before its inclusion in the work noticed, in which it is referred to as the "new curve" (p. 63).

R. MELDOLA.

Transmission of Electric Waves Round the Bend of the Earth.

I BEG leave to amend a sentence in my letter which appeared in NATURE of May 28. I wrote that the existence of a most favourable wave-length for transmission to a given distance appeared to be contradicted by the diffraction theory. A more leisurely study of Prof. MacDonald's paper shows me that I have in this

respect misinterpreted his integrals, and that it is not impossible that the existence of an optimum wave-length may yet be explained by his analysis. This emendation in no way affects the table of ratios I gave or the wording of the conclusion drawn therefrom.

W. ECCLES.

University of London, University College,
June 1.

SCIENCE AND THE STATE.

AT a time when our Government is embarking on large schemes of social legislation at a heavy cost to the community, it seems a fitting opportunity to direct attention to one branch of the public service which has hitherto failed to obtain official recognition or financial support.

It is difficult to realise what our state of civilisation would have been were it not for scientific researches conducted mainly at their own expense by private individuals. The progress which has changed the conditions of our life from those prevailing in the so-called barbaric ages has been effected largely at the expense of a body of reformers who have sacrificed their own prosperity for the benefit of the community in a way which no modern Cabinet Minister would dream of doing, and who have been rewarded for their enthusiasm by neglect and discouragement.

The position of these workers has been ably put forward in the article on "Sweating the Scientist," which appeared in *Science Progress* for April, and was mentioned in the Notes column of NATURE on April 30 (p. 219). A further contribution on the same subject appeared in the form of correspondence by Sir Ronald Ross in the *British Medical Journal* from February 7 to March 28. Let us take Sir Ronald Ross's experiences first, and let us then extend the case to the university workers mainly considered in *Science Progress*.

Sir Ronald Ross was in the Indian Army Medical Service from 1881 to 1899, and not only did he discharge his official duties efficiently, but, at great trouble and expense to himself, he instigated his series of investigations on malaria and its transmission by mosquitoes—a task which prevented him from accepting a civil post which was offered him. The success of his researches led to the foundation in 1899 of the schools of tropical medicine in London and Liverpool, and though the scheme received every encouragement from Mr. Joseph Chamberlain and Mr. Austin Chamberlain, practically the whole of the money was raised by private subscription, although we do read of at least one Government grant of 3,550*l.* in 1899. As against this, we contrast the action of the German Government in financing the Hamburg Tropical School.

Sir Ronald Ross became chief lecturer of the Liverpool School, and thus had to resign his Indian commission on a small pension of under 300*l.* The work of the school was of an altogether exceptional character, involving expeditions to West Africa, teaching of students, publication of reports, and maintenance of experts on Government committees. In the expeditions Sir